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MENDELSOHN & ASSOCIATES, P.C.
1500 JOHN F. KENNEDY BLVD., SUITE 405
PHILADELPHIA, PA 19102

EXAMINER	
NG, CHRISTINE Y	

ART UNIT	PAPER NUMBER
2663	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/017,503	DELL ET AL.	
	Examiner	Art Unit	
	Christine Ng	2663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 December 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,8,12,13,15-21,25,29,30 and 32-41* is/are rejected.

7)☒ Claim(s) *5-7,9-11,14,22-24,26-28 and 31* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 December 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/6/05,12/22/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-4, 8, 12, 13, 15-21, 25, 29, 30 and 32-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,324,165 to Fan et al in view of U.S. Patent No. 5,938,749 to Rusu et al.

Referring to claims 1, 18 and 38, Fan et al disclose in Figure 3 a method of selecting one of a plurality of queues (buffers 32) for service, at least one of the plurality of queues (CBR and VBR buffers 32) associated with a first traffic class (real-time traffic). Refer to Column 1, lines 50-60 and Column 6, lines 57-67. As shown in Figure 9, the method comprising the steps of:

(a) Identifying each first traffic class (FTC) queue having at least one enqueued cell ($VQ_{ij} > 0$) as an occupied FTC queue wherein at least one FTC queue is provisioned for burst scheduling of multiple cells when serviced. Refer to Column 15, lines 23-26 and Column 19, lines 28-31.

(c) Setting as eligible for service each occupied FTC queue based on a FTC scheduling algorithm (Step S900). If $VQ_{ij} > 0$ and the destination OP buffer for the queue is not in the stop mode, a queue is considered to be eligible for service. Refer to Column 15, lines 23-26 and Column 19, lines 28-31.

(d) Selecting for service an eligible FTC queue based on a corresponding sub-priority (PV_{ij}) of each eligible FTC queue (Step S900-S910). After queues are determined to be eligible, "the queue from which to send the cell is determined by a round-robin with priority search based on the priority bits PV_{ij}". Refer to Column 15, lines 28-31 and lines 51-54; and Column 19, lines 26-31.

Each FTC queue is assigned a sub-priority (PV_{ij}) based on a service level of a connection (minimum guaranteed rate M_{ij}) associated with enqueued cells. P_{ij} is set to 'one' under two conditions, both of which depend on M_{ij} (Column 16, lines 34-64). Furthermore, "if the priority bit P_{ij} is set to one, then the stage two priority bit PV_{ij} is set to one" (Column 17, lines 29-30).

Fan et al do not disclose (b) identifying an occupied FTC queue provisioned for burst scheduling as a super-occupied FTC queue when the number of cells enqueued is greater than a specified number; and when the super-occupied queue is serviced, the number of cells dequeued is based on a burst size.

Rusu et al disclose in Figure 2 a switch system wherein the circuitry accelerates the output transfers from queues 101 when the queues 101 are close to filling up (greater than a specified number), as measured by a differential queue length mechanism. Refer to Column 5, lines 52-60. When the queue 101 that is close to filing up is serviced, the number of cells dequeued is based on a burst size (maximum number of cells that may be subtracted from the queue in the programmed time interval). Refer to Column 6, lines 20-27. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include (b) identifying an

occupied FTC queue provisioned for burst scheduling as a super-occupied FTC queue when the number of cells enqueued is greater than a specified number; and when the super-occupied queue is serviced, the number of cells dequeued is based on a burst size. One would be motivated to do so in order to prevent buffer overflow in the system by outputting cells from a buffer that is carrying too many packets.

Referring to claims 2 and 19, Fan et al disclose that for step (a) the first traffic class (real-time traffic) comprises traffic having a provisioned guaranteed level of service (QOS). CBR and VBR are used for real-time traffic flows since they have strict QOS requirements on cell delay, cell loss, and cell delay variation. Each flow "receives its minimum guaranteed rate and hence the QOS is guaranteed for all connections within the flow" (Column 9, lines 23-25). Refer to Column 9, lines 3-37.

Referring to claims 3 and 20, Fan et al disclose for step (a) the provisioned guaranteed level of service is a either a guaranteed bandwidth or a guaranteed effective bandwidth. Each real-time traffic flow supported by CBR or VBR requires a certain guaranteed bandwidth. Refer to Column 9, lines 3-37.

Referring to claims 4 and 21, Fan et al disclose in Figure 1 that step (a) comprises the steps of (a1) identifying whether a queue (16 unicast input/output ports IP1-IP16/OP1-OP16) having cells associated with unicast is occupied; and (a2) identifying whether a queue (one multicast output port MOP) having cells associated with multicast traffic is occupied. The switch supports unicast and multicast traffic, with 16 unicast input/output ports IP1-IP16/OP1-OP16 and one multicast output port MOP. Each port is check for traffic in order to allow multiplexing of unicast and multicast traffic.

The order of priority for multiplexing is 1) multicast real-time traffic; 2) unicast real-time traffic; 3) multicast non-real-time traffic; and 4) multicast non-real-time traffic. Refer to Column 5, lines 8-17; Column 5, line 66 to Column 6, line 12; Column 7, lines 9-44; and Column 26, lines 25-29.

Referring to claims 8 and 25, Fan et al disclose wherein step (c) further comprises the step of further setting an occupied FTC queue as eligible based on congestion information. A queue is eligible at the stage two scheduler if $VQ_{ij} > 0$; $VQ_{ij} > 0$ is true only if an eligible queue (i,j) is selected by the stage one scheduler. The stage one schedule takes into account congestion information when determining eligible queues. Refer to Column 16, lines 34-64; Column 17, lines 22-30; and Column 19, lines 24-36.

Referring to claims 12 and 29, Fan et al disclose in Figure 3 that at least one of the plurality of queues (ABR and UBR buffers 32) is associated with a second traffic class (STC) (non-real-time traffic), step (a) further comprises the step of identifying each STC queue having at least one enqueued cell as an occupied STM queue. Refer to Column 1, line 61 to Column 2, line 7 and Column 6, lines 57-67. Steps (e) and (f) of claims 12 and 29 are equivalent to steps (b) and (c) of claims 1, 18 and 38, except that claims 12 and 29 apply to the STC queues whereas claims 1, 18 and 38 apply to the FTC queues. Fan et al disclose that the method shown in Figure 9 and discussed in Column 14, line 65 to Column 19 line 36 applies to real-time and non-real-time traffic. Refer to the rejection of claims 1, 18 and 38. Furthermore, Fan et al disclose step (g): scheduler/arbiter controller configured to select one of the FTC queue selected for

service, if present, and the STC queue selected for service, if present. "In each cell time, the IM scheduler determines the next queue from which a cell can be transmitted to its destination OP" (Column 14, line 66 to Column 15, line 1) based on the DRC scheme, which applies to real-time and non-real-time traffic. Real-time and non-real-time traffic is multiplexed together according to a priority order. Refer to Column 6, lines 9-12.

Referring to claims 13 and 30, Fan et al disclose that the method further comprises the steps of assigning each FTC queue priority over each STC queue, and selecting either the FTC queue or the STC queue based on the assigned priority. The order of priority for multiplexing is 1) multicast real-time traffic; 2) unicast real-time traffic; 3) multicast non-real-time traffic; and 4) multicast non-real-time traffic. Refer to Column 6, lines 9-12.

Referring to claims 15 and 32, Fan et al disclose that step (e) includes the step of accounting for delay in service of each eligible STC queue. ABR and UBR (STC classes) do not have strict QOS requirements but they are guaranteed a minimum rate during DRC scheduling. For each connection, the guaranteed minimum rate includes parameters such as cell loss probability, delay, and/or delay jitter. Refer to Column 9, lines 39-51 and Column 10, lines 24-40.

Referring to claims 16 and 33, Fan et al disclose that the second traffic class is best effort traffic. Fan et al disclose that the second traffic class is non-real-time traffic. Non-real-time traffic is similar to best effort traffic in that it does not require strict bandwidth and QOS requirements. Refer to Column 9, lines 38-64.

Referring to claims 17, 34 and 37, Fan et al disclose that the method can be embodied as program steps in a processor of an integrated circuit (claim 17), the scheduler can be embodied in a telecommunications switch (claim 34), and the scheduler is embodied in an integrated circuit (claim 37). Fan et al disclose in Figure 1 that the invention is in a switch, and also discloses in Figure 3 that the input/output modules are composed of circuitry. Refer to Column 5, lines 8-17 and Column 6, lines 57-67.

Referring to claim 35, Fan et al disclose that the telecommunications switch is a three stage switch, the plurality of queues (Figure 3, buffers 32) are associated with connections received at a plurality of input ports (Figure 1, IL1i-IL16i) of the first stage (Figure 1, input modules), and the scheduler (Figure 3, scheduler) is embodied in the first stage (Figure 1, input modules) to transfer cells to a plurality of input links (IP1-IP16) of the second stage (Figure 1, core switch module). Refer to Column 5, lines 8-27; Column 5, line 66 to Column 6, line 12; and Column 6, lines 57-67.

Referring to claim 36, Fan et al disclose that the telecommunications switch is a three stage switch, the plurality of queues (Figure 3, buffers 32) are associated with cells received from output links (Figure 1, OP1-OP16) of the second stage (Figure 1, core switch module), and the scheduler (Figure 3, scheduler) is embodied in the third stage (Figure 1, output modules) to transfer cells from the plurality of queues (Figure 3, buffers 32) to a plurality of output ports (Figure 1, OL1i-OL16i). Refer to Column 5, lines 8-27; Column 5, line 66 to Column 6, line 12; and Column 6, lines 57-67.

3. Claims 39-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,324,165 to Fan et al in view of U.S. Patent No. 5,938,749 to Rusu et al, and in further view of U.S. Patent No. 6,229,812 to Parruck et al.

Fan et al do not specifically disclose that more than one cell is dequeued from the super-occupied queue during a single selection of the super-occupied queue for service.

Parruck et al disclose in Figure 3 an ATM system with schedulers that select ATM cells from among the connected buffer structures 302 using a round robin selection technique, a weighted rout-robin selection technique, etc. Refer to Column 7, line 51 to Column 8, line 20. In the weighted round robin technique for scheduling ATM cells (Figure 7), data bursts of multiple consecutive ATM cells may be outputted from the same buffer or virtual connection. For example: VC's B and C require twice the data transmission rate of VC A, and VC D requires four times the data transmission rate of VC A. VC A is given a weight of 1, VC's B and C are given a weight of 2 each, and VC D is given a weight of 4. So, a burst of one cell will be output from queue 702, a burst of 2 consecutive cells will be output from queues 704 and 706, and a burst of 4 consecutive cells will be output from queue 708. Refer to Column 11, lines 3-64. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include that more than one cell is dequeued from the super-occupied queue during a single selection of the super-occupied queue for service. One would be motivated to do so in order to output more cells from a queue that has more information to send, thereby ensuring a equal output rate from all queues.

Allowable Subject Matter

4. Claims 5-7, 9-11, 14, 22-24, 26-28 and 31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

5. Applicant's arguments filed December 21, 2005 have been fully considered but they are not persuasive.

Referring to the argument of independent claim 1 that Rusu et al do not teach that more than one cell is extracted from the selected queue every time the queue is selected for service (page 10, lines 1-30): Independent claim 1 states that "when the super-occupied queue is serviced, the number of cells dequeued is based on a burst size" (lines 14-15). The claim does not specify that more than one cell is dequeued from the super-occupied queue *each time* the queue is selected from service. Rusu et al disclose that there is a maximum number of cells that may be subtracted from the queue in the programmed time interval (Column 6, lines 22-24). The output cell flow can be increased or decreased in order to compensate for the relative change in the queue flow during the predefined time interval (Column 4, lines 1-5 and lines 54-59). Therefore, even if one cell is transmitted out of the queue each time the queue is serviced, the total amount of cells dequeued from the queue over a predefined interval when the queue is serviced depends on the queue size and does not exceed the maximum number of cells that may be subtracted.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christine Ng whose telephone number is (571) 272-3124. The examiner can normally be reached on M-F; 8:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on (571) 272-3155. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

C. Ng CN
February 23, 2006

HUY D. VU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600